



Cypermethrin

CAS: 52315-07-8

Molecular formula: $C_{22}H_{19}Cl_2NO_3$

Description

Cypermethrin is a synthetic pyrethroid used as an insecticide in large-scale commercial agricultural applications as well as in consumer products for domestic purposes. It behaves as a fast-acting neurotoxin in insects. It is easily degraded on soil and plants but can be effective for weeks when applied to indoor inert surfaces. It was synthesised in 1974 and first marketed in 1977, by Shell.

Cypermethrin is highly toxic to fish, bees and aquatic insects, according to the National Pesticides Telecommunications Network (NPTN). It is found in many household ant and cockroach killers, including Raid and ant chalk.

Cypermethrin is a synthetic chemical similar to the pyrethrins in pyrethrum extract (which comes from the chrysanthemum plant). Pyrethroids, including cypermethrin were designed to be effective longer than pyrethrins.

Health issues

Animals

Cockroach brain cells exposed to very small doses (up to 0.02 micrograms per gram of brain weight or cg/g) of cypermethrin exhibited a nervous system response, which in cockroaches, would result in restlessness, incoordination, prostration, and paralysis

Mice exposed to small doses (0.3 to 4.3 cg/g) of cypermethrin displayed symptoms including writhing, convulsions, and salivation .

Rats exposed to cypermethrin exhibited similar symptoms including tremors, seizures, writhing, and salivation as well as burrowing behavior. Cypermethrin may be a weak skin sensitizer in guinea pigs. Newborn rats were more sensitive to cypermethrin than adult rats. The liver enzymes that break down cypermethrin in the body are not completely developed in the newborn rats.

Humans

People handling or working with pyrethrins and pyrethroids (including cypermethrin) sometimes

developed tingling, burning, dizziness, and itching. Symptoms of poisoning include abnormal facial sensations, dizziness, headache, nausea, anorexia and fatigue, vomiting and increased

stomach secretion. Cypermethrin is also a skin and eye irritant. Normally, symptoms should disappear after some days but severely exposed patients additionally may suffer from muscular twitching, comata and convulsive attacks. In such cases, symptoms may persist for some weeks.

Humans excrete cypermethrin rapidly. Men who voluntarily ingested low doses of cypermethrin (0.25, 0.5, 1, or 1.5 milligrams per kilogram of body weight or mg/kg) in corn oil excreted between 49 to 78 percent of cypermethrin within 24 hours. These studies, along with results from animal studies, indicate that cypermethrin is unlikely to accumulate in the body.

Carcinogenicity

Animals

Mice fed high doses (up to 1600 mg/kg) over a lifetime did not develop cancer (malignant tumors). However, some of the female mice developed benign (non-cancerous) lung tumors.

Humans

The US EPA has classified cypermethrin as a possible human carcinogen (group C) because there is limited evidence that it causes cancer in animals. Scientists have no data from work-related, accidental poisoning, or epidemiological studies that indicate whether or not cypermethrin is likely to cause cancer in humans.

IARC Carcinogenity

Not listed

Cypermethrin is classified by the World Health Organisation (WHO) as 'moderately hazardous' (Class II)

Environmental effects

The typical half-life of cypermethrin in the soil is 30 days, although it can range from two to eight weeks. Soil microbes rapidly break down cypermethrin. Cypermethrin has an extremely low potential to move in the soil. It is unlikely to contaminate groundwater because it binds tightly to soil particles.

Cypermethrin is stable in sunlight.

The average half-life of cypermethrin on foliage is 5 days.

The pyrethroids are widely used because of their general low toxicity to birds and mammals. However, they are highly toxic to aquatic organisms and fish as well as to bees - with the same mode of action in each organism. The LC50 values for small fish and other aquatic organisms typically lie below 1 µg/l, and the LD50 value for bees is 0.03 - 0.12 µg/kg. For use with conventional hydraulic sprayers, buffer zones of 16-24 m are needed to reduce mortality of butterflies in the surroundings. After indoor use, cypermethrin residues may be found in dust and carpets with a concentration up to 4 mg/kg(16). The concentration in the air after an indoor treatment increases rapidly, but can then stay relatively constant for months at values for which pyrethroids can cause adverse health effects (3-8 µg/m³)

Synonyms

alfa-cyano-phenoxybenzyl , -dichlorovinyl ,dimethylcyclopropane, carboxylate (IUPAC)
cyano-(-phenoxyphenyl) methyl ,dichloroethenyldimethylcyclopropane,

Hazardous symbols

Dangerous for the environment, Harmful



R phrases

R20/22: Harmful by inhalation and if swallowed

R37: Irritating to respiratory system

R50/53: Very toxic to aquatic organisms, may cause long-term adverse effects in the aquatic environment

S phrases:

(S2): Keep out of the reach of children

S24: Avoid contact with skin

S36/37/39: Wear suitable protective clothing, gloves and eye/face protection

S60: This material and its container must be disposed of as hazardous waste

S61: Avoid release to the environment. Refer to special instructions/safety data sheet

Links

<http://npic.orst.edu/factsheets/cypermethrin.pdf>

<http://cs.wikipedia.org/wiki/Cypermethrin>

<http://www.inchem.org/documents/pims/chemical/pim163.htm#SectionTitle:1.3%20%20Synonyms>

<http://www.mpo.cz/hledani.html>

<http://cs.wikipedia.org/wiki/S-v%C4%9Bty>

<http://www.inovace.cz/for-life/zivotni-prostredi/clanek/-2/>

http://www.futurchem.cz/photo/download/BEZPECNOSTNI_LIST_REACH_Cyper_10_EM.pdf

<http://www.pan-uk.org/pestnews/Actives/cypermethrin.htm>



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